EMIF10-LCD01C1

10 LINES EMI FILTER AND ESD PROTECTION

IPAD™

MAIN PRODUCT CHARACTERISTICS:

Where EMI filtering in ESD sensitive equipment is required :

- LCD for Mobile phones
- Computers and printers
- Communication systems
- MCU Boards

DESCRIPTION

The EMIF10-LCD01C1 is a 10 lines highly integrated devices designed to suppress EMI/RFI noise in all systems subjected to electromagnetic interferences. The EMIF10 flip chip packaging means the package size is equal to the die size. This filter includes an ESD protection circuitry, which prevents the device from destruction when subjected to ESD surges up 15kV.

BENEFITS

- EMI symmetrical (I/O) low-pass filter
- High efficiency in EMI filtering
- Very low PCB space consuming: < 7mm^2
- Coating resin on back side
- Very thin package: 0.69 mm
- High efficiency in ESD suppression on input pins (IEC61000-4-2 level 4)
- High reliability offered by monolithic integration
- High reducing of parasitic elements through integration and wafer level packaging.

COMPLIES WITH THE FOLLOWING STANDARDS:

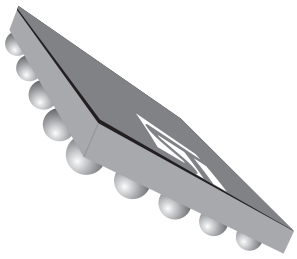
IEC61000-4-2:

Level 4 input pins 15kV (air discharge)
8kV (contact discharge)
Level 1 output pins 2kV (air discharge)
2kV (contact discharge)

MIL STD 833E - Method 3015-6 Class 3

Table 1: Order Code

Part Number	Marking
EMIF10-LCD01C1	FL



Flip-Chip
(25 bumps)

Figure 1: Pin Configuration (ball side)

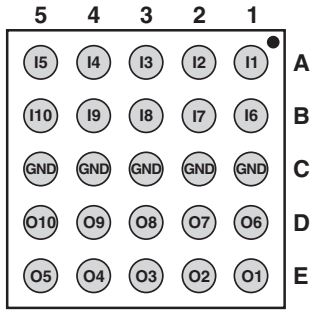


Figure 2: Basic Cell Configuration

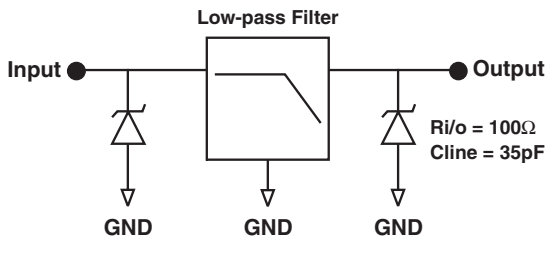
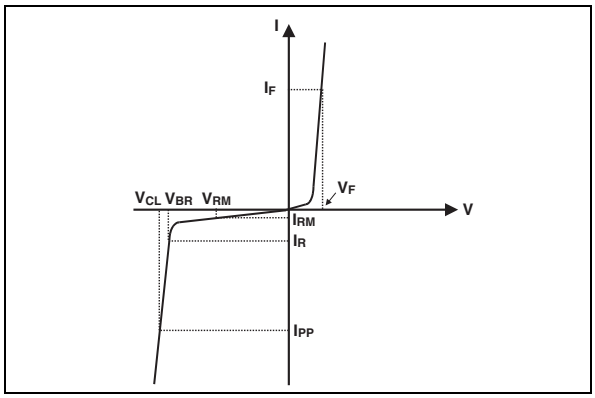


Table 2: Absolute Maximum Ratings (T_{amb} = 25°C)

Symbol	Parameter	Value	Unit
T_j	Junction temperature	125	°C
T_{op}	Operating temperature range	-40 to + 85	°C
T_{stg}	Storage temperature range	-55 to +150	°C

Table 3: Electrical Characteristics (T_{amb} = 25°C)

Symbol	Parameter
V_{BR}	Breakdown voltage
I_{RM}	Leakage current @ V_{RM}
V_{RM}	Stand-off voltage
V_{CL}	Clamping voltage
Rd	Dynamic resistance
I_{PP}	Peak pulse current
$R_{I/O}$	Series resistance between Input & Output
Cline	Input capacitance per line



Symbol	Test conditions	Min.	Typ.	Max.	Unit
V_{BR}	I_R = 1 mA	6	8	10	V
I_{RM}	V_{RM} = 3V			500	nA
$R_{I/O}$		90	100	110	Ω
Cline	@ 0V bias		28	35	pF
Rt / Ft	Induced rise and fall time 10-90% at 26 MHz frequency signal V = 1.9 V (Rt / Ft input 1 ns, 50Ω impedance generator)		8 (1)		ns

(1) guaranteed by design

Figure 3: S21(dB) all lines attenuation measurement and Aplac simulation

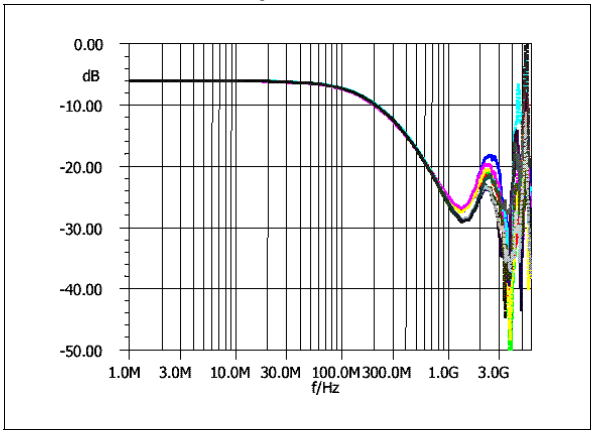


Figure 4: Analog cross talk measurements

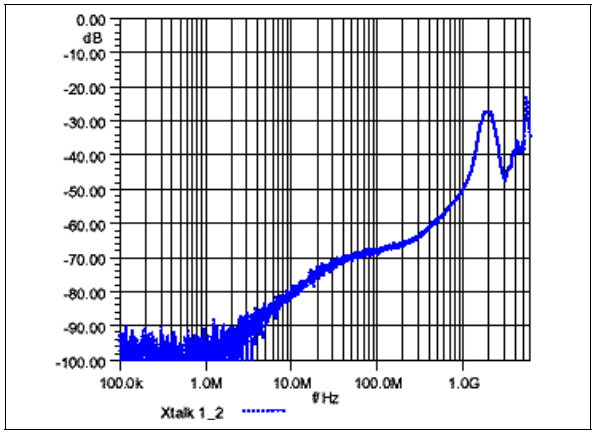


Figure 5: ESD response to IEC61000-4-2 (+15kV air discharge) on one input and on one output

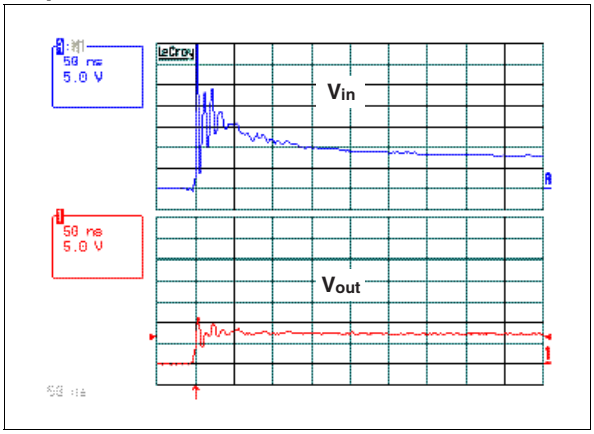


Figure 6: ESD response to IEC61000-4-2 (-15kV air discharge) on one input and on one output

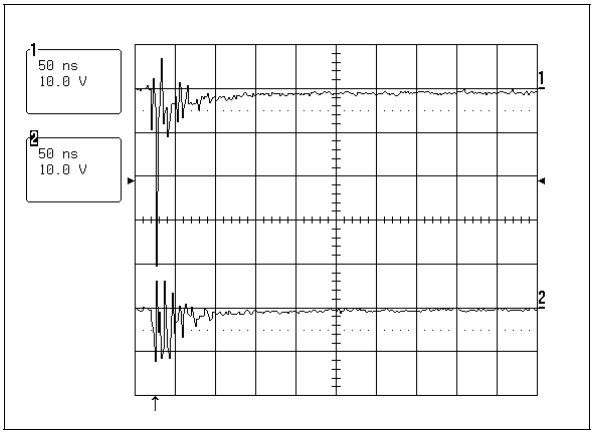


Figure 7: Line capacitance versus applied voltage

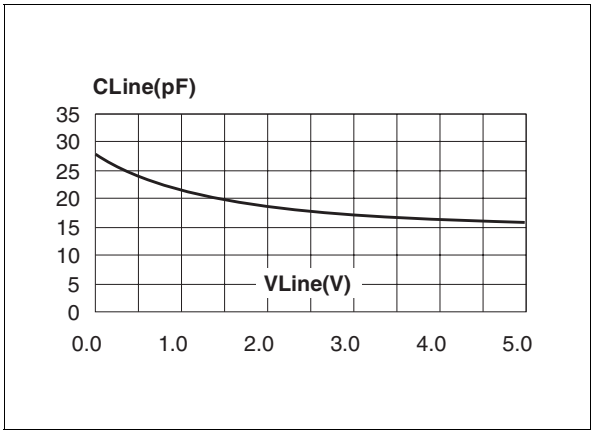


Figure 8: Rise time 10-90% measurements with 1.9V signal at 26 MHz frequency (50Ω generator)

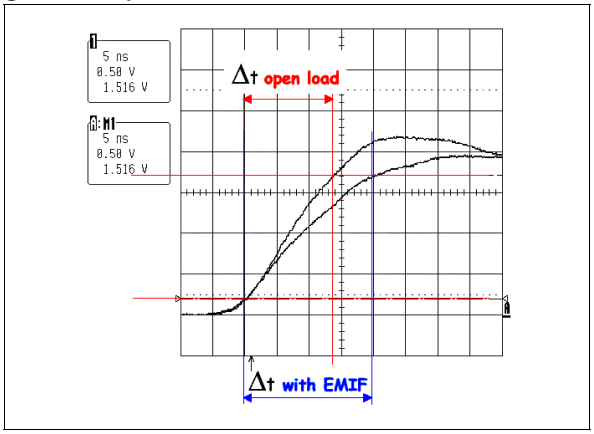


Figure 9: Fall time 10-90% measurements with 1.9V signal at 26 MHz frequency (50Ω generator)

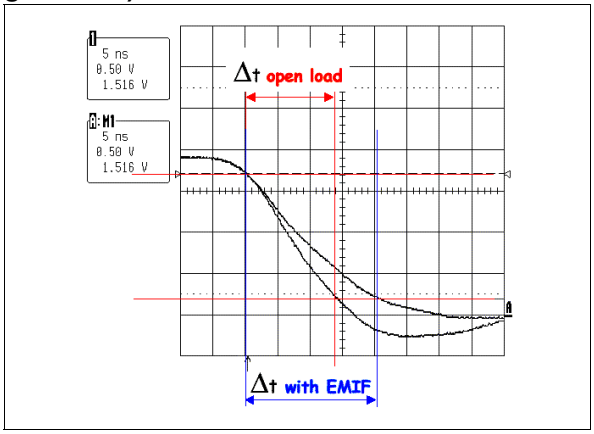
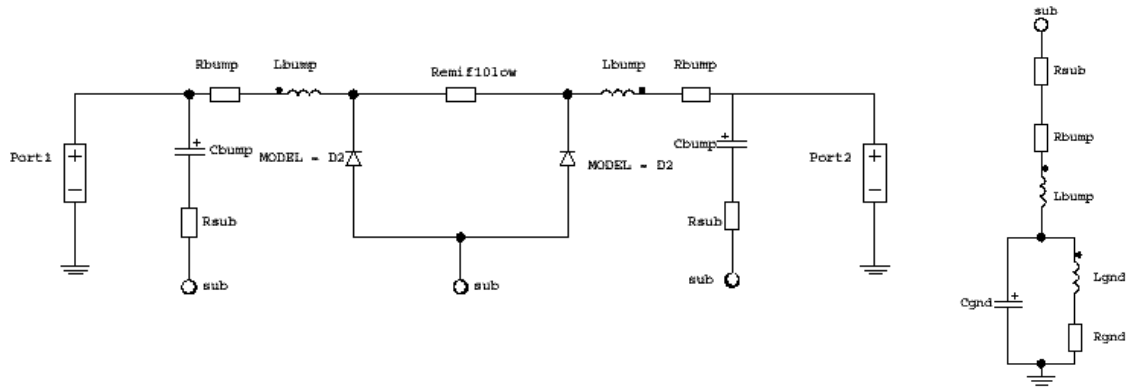


Figure 10: Aplac model



EMIF10-LCD01C1 model **Ground return**

Figure 11: Aplac parameters

ZRZ structure	
aplacvar Remif10low 100	BV = 7
aplacvar Cemif10flow 17.5pF	CJO = Cemif10low
Bumps	IBV = 1u
aplacvar Lbump 50pH	IKF = 1000
aplacvar Rbump 20m	IS = 10f
aplacvar Cbump 1.5pF	ISR = 100p
Bulk	N = 1
aplacvar Rsub 100m	M = 0.3333
Gnd connections	RS = 0.015
aplacvar Rgnd 100m	VJ = 0.6
aplacvar Lgnd 200pH	TT = 50n
aplacvar Cgnd 0.15pF	

Figure 12: Order Code

EMIF yy - xxx zz Fx

EMI Filter

Number of lines

Information

x = resistance value (Ohms)
z = capacitance value / 10(pF)
or
3 letters = application
2 digits = version

Package

F = Flip-Chip
x = 1: 500µm, Bump = 315µm
= 2: Leadfree Pitch = 500µm, Bump = 315µm
= 3: Leadfree Pitch = 400µm, Bump = 250µm

Figure 13: FLIP-CHIP Package Mechanical Data

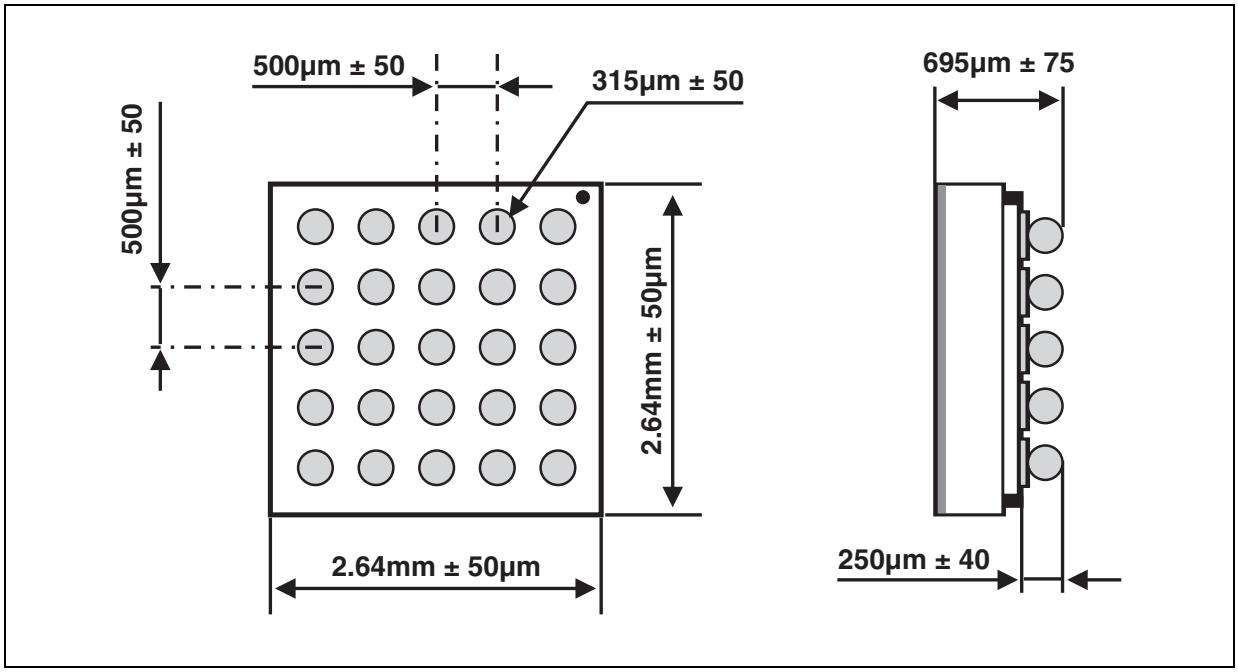


Figure 14: Foot Print Recommendations

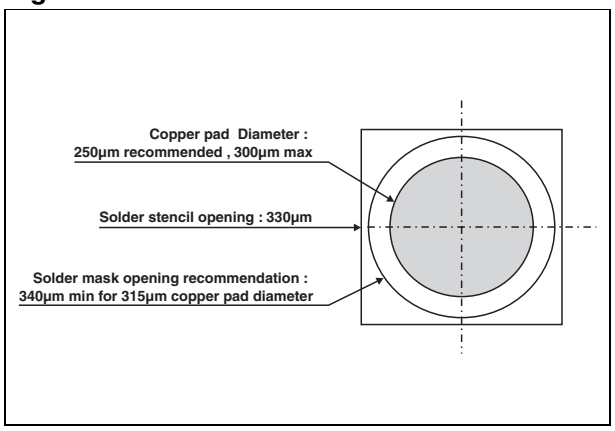


Figure 15: Marking

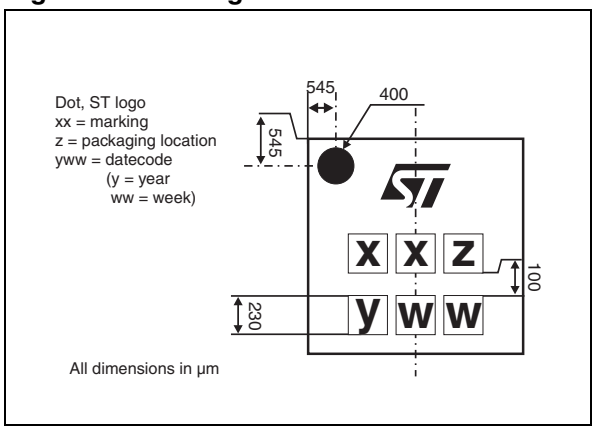


Figure 16: FLIP-CHIP Tape and Reel Specification

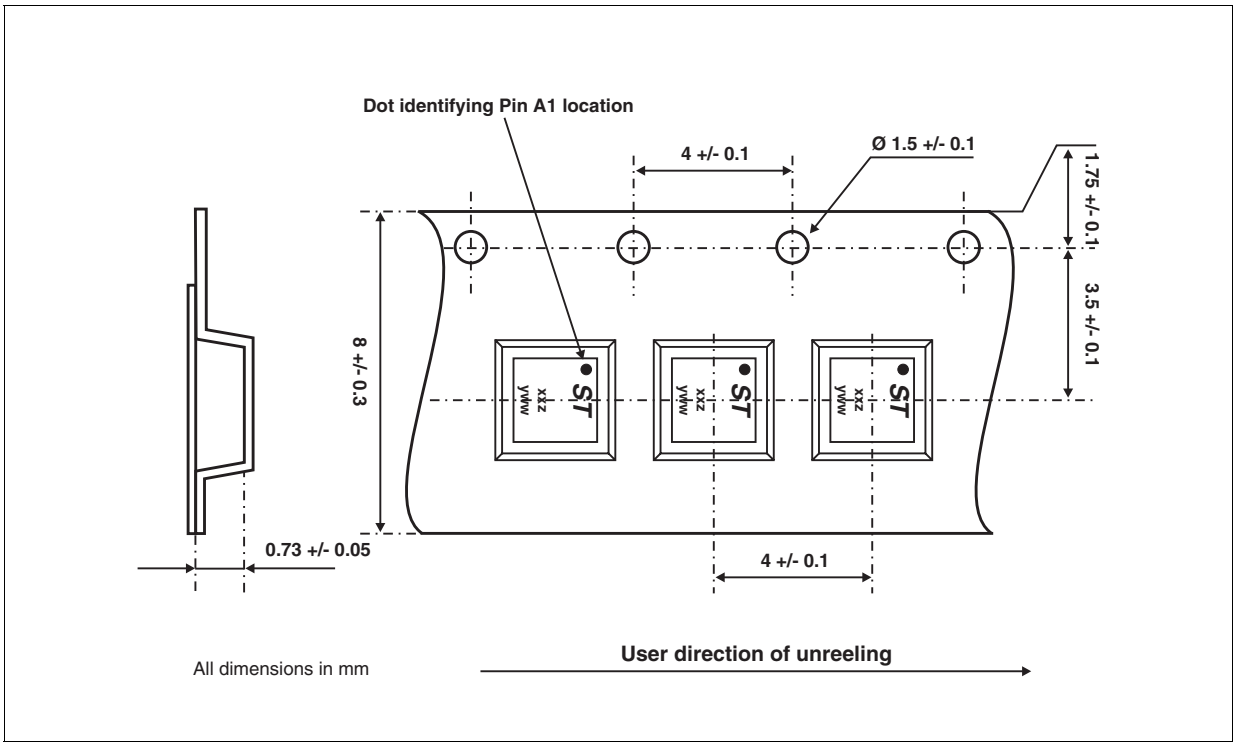


Table 4: Ordering Information

Part Number	Marking	Package	Weight	Base qty	Delivery mode
EMIF10-LCD01C1	FL	Flip-Chip	9.3 mg	5000	Tape & reel (7")

Note: Further packing information available in the application notes
- AN1235: "Flip-Chip: Package description and recommandations for use''
- AN1751: "EMI Filters: Recommendations and measurements"

Table 5: Revision History

Date	Revision	Description of Changes
Sep-2004	1	First issue
09-Jun-2005	2	Modified C_{line} Typical and Maximum values